Milwaukee River Report Card

— 2010 —



www.milwaukeeriverkeeper.org

Overall Final River Grade: B-

Oxygen grades were generally good within the watershed; several sites in headwater creeks did not consistently meet standards for oxygen.

Water temperature grades were largely good with some problem areas.

Water clarity (or turbidity) grades were good in the East and West Branches of the Milwaukee River and Cedar Creek. Turbidity grades were poor both for the Milwaukee River South and the North Branch of the Milwaukee River.

Grades for **pH** were good, and largely stable for most sites monitored.

Data for **bacteria** and **chloride** were only available for several monitoring sites in the Milwaukee River South. The subwatershed received an overall "F" grade for both bacteria and chloride.

What Do the Grades Mean?

All water quality indicators meet desired targets 90-100% of the time. Streams or river segments have "good" water quality, which are capable of supporting fish and other aquatic life.

B :

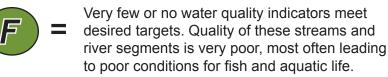
Most water quality indicators meet desired targets roughly 80-89% of the time. Quality of these streams and river segments tends to be good; most areas are capable of supporting fish and other aquatic life.

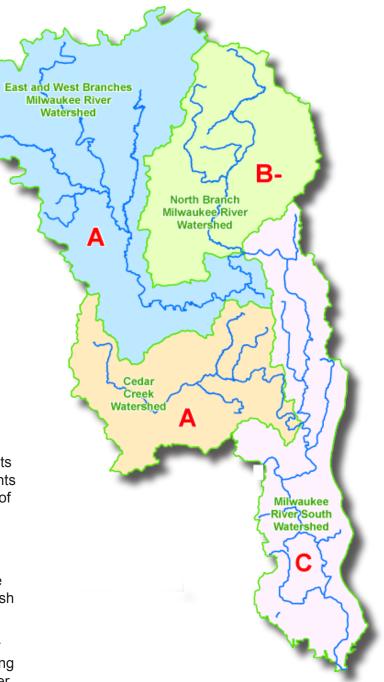


There is a mix of healthy and unhealthy water quality indicators, or indicators are only meeting water quality targets 70-79% of the time. Water quality of these waters tends to be fair, as well as conditions for fish and aquatic life.



Few water quality indicators meet desired targets, or only meet water quality targets 60-69% of the time. Water quality and wildlife habitat of these waters tends to be poor.





Report card grades for the Milwaukee River and its tributary streams in 2010.

The grades are largely based on water quality data collected by Milwaukee Riverkeeper volunteer stream monitors at 38 sites in the Milwaukee River Watershed. These grades also include Wisconsin Department of Natural Resources (WDNR) data at 4 monitoring sites and Milwaukee Metropolitan Sewerage District (MMSD) data collected at 21 sites (all in Milwaukee River South).

More information on water quality grades and targets for watershed health can be found on pages 4-7 and on our website at www.milwaukeeriverkeeper.org.

Introduction

Dear Friend of the River,

Welcome to our first Milwaukee River Report Card. This report card summarizes the 2010 water quality of the Milwaukee River Watershed. Water quality grades are based on data from our dedicated cadre of Milwaukee Riverkeeper citizen stream monitoring volunteers, as well as from data from the Wisconsin Department of Natural Resources (WDNR) and Milwaukee Metropolitan Sewerage District (MMSD).

This annual report card is your guide to how well we are doing to meet the fishable, swimmable goals for the Milwaukee River, as envisioned under the Clean Water Act. It provides a snap shot of the health of the river within different subwatersheds, as measured by basic parameters such as dissolved oxygen, temperature, turbidity, pH, and macroinvertebrates or biotic life. The report card also includes MMSD data for bacteria and chloride taken in the Milwaukee River South subwatershed; these two pollutants are major impediments to the Milwaukee River meeting its fishable, swimmable goals.

Lastly, the report card provides ideas for what you can do to help improve the water quality of the Milwaukee River Watershed. If we are serious about achieving clean water and healthy communities, we must change the way that we live on the land. By all working together, we can be the solution to pollution affecting our waterways!

Sincerely,

6hgl Nr

Joseph Rath

Cheryl Nenn, Riverkeeper

Joe Rath, Water Quality Specialist

P.S. Our 2011 report card will be available in Summer 2012, and will include citizen collected data for phosphorus and chloride for the first time! If you are interested in becoming a citizen stream monitor, please contact us!

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Milwaukee River Report Card 2010

How Healthy is the Milwaukee River & its Tributaries?

Overall, the Milwaukee River water quality in 2010 was good, and received an overall grade of **B**-.

A comparison of the subwatersheds shows that most are meeting water quality goals for warm water sport

fisheries; however, problems exist with respect to low dissolved oxygen levels in the smaller, headwater streams of the North Branch, as well as turbidity problems in both the North Branch and South Branch of the Milwaukee River (see the map and explanation of water quality parameters on the following page for more details). In addition, MMSD data for the Milwaukee River South watershed show serious water quality problems with both bacteria and chloride.

These problems resulted in the North Branch subwatershed receiving an overall B- grade and the Milwaukee River South subwatershed receiving an overall C grade. The Cedar Creek and East West Branches both received an A grade.

Of the 38 sites monitored by Riverkeeper volunteers, all the sites assessed met instantaneous and continuous **water temperature** goals for warm water



An aerial view of the south branch of the Milwaukee River. Photo by Kimberly Gleffe.

sport fisheries of less than 31.7 degrees C (continuous or hourly water quality data is available for 27 of 38 sites). Interestingly, almost all of the sites are also meeting instantaneous water temperature goals for cool water streams (less than 28 degrees C) and cold water streams (less than 25 degrees C), including several sites on Ulao Creek, Pigeon Creek, Riveredge Creek, Mink Creek, Melius Creek (currently listed as a trout stream), Batavia Creek, North Branch Milwaukee River, and many Milwaukee River mainstem sites. This means that many of these streams could possibly support colder water fisheries and receive state designations or upgraded regulatory classifications that could give them more protection and help us better meet our "fishable" goals.

Most sites are meeting water quality targets for **dissolved oxygen** 100% of the time; however, a few sites are meeting targets only 50% of the time (e.g. sites on Mink Creek, Ulao Creek, Batavia Creek) with other sites somewhere in between (e.g. sites on Lincoln, Mole, Mud, Cedar, and Ulao Creeks all are meeting standards generally between 50-75% of the time).

Most sites throughout the watershed are meeting **turbidity** thresholds, except for stream sites within the Milwaukee River South – almost all failed to meet turbidity or clarity targets throughout the season. The Milwaukee River South includes many sites on the mainstem of the Milwaukee River, as well as several sites on Mole, Fredonia, Ulao, and Pigeon Creeks. The North Branch of the Milwaukee River at Riverside Road also had some major problems - meeting turbidity targets 0% of the time. Other sites with seasonal problems include the Milwaukee River at the Riveredge Sturgeon Rearing Facility and Cedar Creek at Division Road. High turbidity can stress fish and smother eggs, and when water turbidity is high over a long period of time, death of fish and aquatic life can result.

The health of the river as measured by **macroinvertebrates** or biotic life measures fair to poor for 9 of the 11 sites assessed. Macroinvertebrates are a good overall biological measure of stream health. All sites are also pretty stable as far as pH levels go—generally lying on the slightly basic side of the spectrum.

The Results

-continued on page 6

How Did We Grade Water Quality Parameters?

To determine water quality grades for the Milwaukee River, a combination of Riverkeeper volunteer stream monitoring data and water quality data from two government agencies, the Wisconsin Department of Natural Resources (WDNR) and the Milwaukee Metropolitan Sewerage District (MMSD), were analyzed.

Data collected by Riverkeeper volunteers was assessed for several water quality parameters to determine grades for this report, including dissolved oxygen (DO), water temperature, pH, turbidity (or water clarity), and macroinvertebrate life. Our citizen water quality monitors use standard, calibrated monitoring equipment to measure DO, water temperature, and pH on a monthly basis between May and October. Volunteers use transparency tubes to test for turbidity. Most volunteers also deploy continuous water temperature loggers called thermistors, which record hourly water temperature readings throughout the monitoring season. Macroinvertebrate data was used to assess aquatic ecosystem health. WDNR water quality data was used for four sites, and chloride and bacteria data from 21 MMSD sites was used to help supplement volunteer data. Agencies such as WDNR and MMSD often test for chloride and bacteria concentrations monthly (and sometimes more frequently) at various sites throughout the watershed.

Below is a description of water quality parameters assessed for the report card, and the targets or goals that water quality data was assessed against to determine health and condition of waterways.

DISSOLVED OXYGEN (DO)

Dissolved oxygen is crucial for aquatic life. Some streams and steam segments in the Milwaukee River Watershed have regulatory variances (per State of Wisconsin Administrative Code) allowing DO concentrations as low as 2 mg/L, which is suitable only for the most pollution tolerant fish species. However, we believe all streams and stream segments in the Milwaukee River Watershed can reach *at least* the Warm Water Sport Fishery (WWSF) concentration of 5 mg/L (most streams in the watershed are designated WWSF), and this was the target we used to determine if waterways could support a diverse ecosystem of fish and aquatic life. There are several streams in the watershed already meeting or capable of meeting cool or cold water standards for fish and aquatic life.

TEMPERATURE

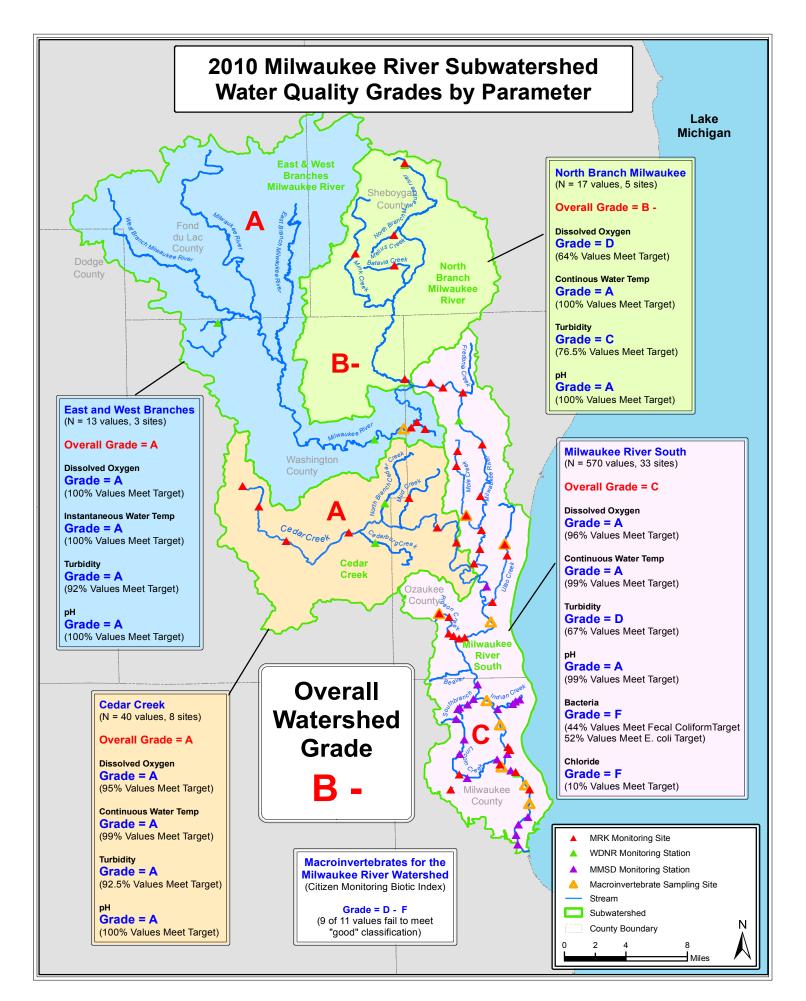
Water temperature also greatly affects fish and aquatic life. As the majority of streams and stream segments in the Milwaukee River Watershed are classified as existing or attainable WWSF streams, we believe the water temperature target should at least remain below the WWSF continuous water temperature maximum standard of 31.7°C.

pH LEVEL

pH is a measure of acidity, or the amount of Hydrogen (H+) ions in the water. pH ranges from 0 to 14 (0 being most acidic, 14 being most basic) with a value of 7 representing a "neutral" solution. Milwaukee River watershed streams generally run on the basic side of neutral, with values typically between 7 or 8 on the pH scale. It is generally accepted that a pH range of 6-9 can support a healthy aquatic ecosystem.

TURBIDITY

Turbidity, or water clarity, affects both the light and energy inputs available to aquatic ecosystems. Our volunteers measure turbidity using transparency tubes; clear, plastic vertical tubes, which are filled and/or emptied of stream water until they barely reveal the black and white pattern on the bottom of the tube. A height of at least 54.7 cm of stream water in a 120 cm transparency tube indicates a healthy water turbidity acceptable for aquatic life, and this was used as the target for stream health.



MMSD had **bacteria** and **chloride** data available for 21 sites in the Milwaukee River South subwatershed for 2010. Overall, the sites tested failed to meet the fecal coliform standard for recreational use 56% of the time and the *E. coli* standard 48 % of the time. Presence of bacteria in the river could indicate likely presence of viruses or pathogens that could make people sick, and is an obstacle to meeting our "swimmable" goals. The sites also exceeded EPA's recommended chloride goals for aquatic life 90% of the time. High chloride levels stem largely from road salt and water softeners, and can be toxic or fatal for fish and aquatic life, making it difficult to reach our "fishable" goals in many portions of the watershed.

In summary, while most volunteer monitoring sites are regularly meeting standards for warm water sport fisheries, many of our creeks continue to see seasonal problems with temperature and oxygen during the hot summer months, as well as major problems with turbidity or clarity of the water due to localized impacts from construction activities and stormwater runoff from both agricultural and urbanized areas. In addition, high bacteria levels from both urban and rural stormwater runoff, failing sewer infrastructure, and sanitary sewer overflows during heavy rains continues to be a major problem. High chloride loading also threatens fish and aquatic life.

Water Quality Parameters, continued from page 4

MACROINVERTEBRATES

For macroinvertebrates, Milwaukee Riverkeeper volunteers use a simple biotic index developed by a group of Wisconsin scientists and specifically designed for streams in Wisconsin. Index score classifications range from Excellent-Good-Fair-Poor. Our target for sites in the Milwaukee River Watershed is a "good" classification. Because macroinvertebrates can't readily migrate like fish, they provide a good overall indicator of the health of a certain reach of stream, and tend to be classified per their tolerance to a range of oxygen conditions.

CHLORIDE

High chloride concentrations in rivers and streams are toxic to aquatic organisms. Road salt runoff constitutes a large source of chloride. Elevated levels of chloride can disrupt an organism's ability to maintain a natural internal water balance, which leads to impaired survival, growth, and/or reproduction. The Environmental Protection Agency (EPA) suggests chloride levels ranging from 150 to 500 umhos/cm are acceptable habitat for most aquatic organisms, and this range was our target for a healthy stream.

BACTERIA

High bacteria concentrations impact not only stream health, but human health as well. Regulatory agencies such as MMSD and WDNR regularly test for fecal coliform and *E. coli* bacteria. According to State of Wisconsin Recreational Use Standards, fecal coliform levels should never exceed 200 CFU/mL (colony forming units/milliliter) and the EPA established an *E. coli* standard of 235 MPN/mL (most probable number/ milliliter). These targets were used for available data in the Milwaukee River South subwatershed.

NOTE: Grades for each water quality parameter are based on the percentage of time that the data points for the monitoring stations in each subwatershed meet or fail to meet our targets relating to overall aquatic ecosystem health. Grades were assigned on a typical percentage basis (90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D and below 60%=F). Overall grades for each subwatershed were determined based on averaging grades for each individual parameter, and the overall watershed grade was determined by averaging the overall grades for each subwatershed.

It is important to note though that citizen volunteers are only monitoring basic water quality parameters at present, with several pilot citizen monitoring projects initiated in 2011 for phosphorus and chlorides (e.g. road salt runoff). MMSD is monitoring for bacteria and chlorides, but only within the Milwaukee River South subwatershed, which is within their service area. Thus, our report card only shows a part of the picture.

The Southeastern Wisconsin Regional Planning Commission (or SEWRPC) completed the Regional Water Quality Management Plan for Southeastern Wisconsin in 2007, analyzing agency and citizen data for the Milwaukee River from 1975 to 2004. While finding similar results for temperature and dissolved oxygen, SEWRPC found that most sites assessed in the Milwaukee River Watershed were not meeting regulatory bacteria levels (for fecal coliform) or planning goals for total phosphorus from 1998-2004. There is also very little data in general for the northern portion of the Milwaukee River Watershed, including the East and West Branches and North Branch of the River.

In addition, even streams with otherwise "good" water quality indicators could still prevent the Clean Water Act's "fishable, swimmable" goals from being attained if toxic substances are present in water, sediment, or tissue of aquatic organisms in high amounts. For example, concentrations of PCBs (a toxic industrial pollutant) in tissue from all aquatic organisms sampled downstream of Pioneer Road on the Milwaukee River were above the threshold used by WDNR for determining fish consumption advisories. Upstream of Pioneer Road, this threshold was exceeded 20% of the time. PCBs are very high in portions of Cedar Creek downstream from Cedarburg (this area is a designated Federal Superfund Site), as well as in Milwaukee River sediments upstream from Estabrook Dam (currently being cleaned up by WDNR).

Concentrations of petroleum products, pharmaceutical and personal care products, industrial solvents, flame retardants, insect repellants, and other toxins have also been detected at various Milwaukee River sites; however, most of these substances are not currently regulated, and many do not have safety criteria associated with them. Thus, it is important to note that there are other issues of concern that are not factored into our grading system, and which should be considered when assessing overall river health.

"While the water quality of the Milwaukee River has vastly improved since the early 1970s, there are still many challenges to achieving fishable, swimmable goals."



Spotlight on Pigeon Creek

Pigeon Creek is approximately 8 miles long and drains more than 7,740 acres of farms and subdivisions before entering the Milwaukee River just downstream of the Thiensville Dam on the Milwaukee River. This suburban watershed contains 640 acres of intact wetlands, with at least 350 acres of additional degraded wetlands that could be restored. Approximately 22 miles downstream of the creek confluence, the Milwaukee River enters Lake Michigan.



In 1929, the Wisconsin Lutheran Seminary built a 24 foot wide timber and stone dam on Pigeon Creek to create a pond as part of the creation of their beautiful 80-acre campus in Mequon. This dam was rebuilt of concrete in 1951, and in the last decade, had badly degraded. In addition, build-up of sediment behind the dam required periodic dredging, which was last done in the 1980s. In the summer, the pond was often choked with algae, poor in water quality, and attracted nuisance Canada geese. In 2006, faced with a fairly hefty repair bill of over \$100,000 and additional dredging costs, the Seminary agreed to support removal of the dam and the

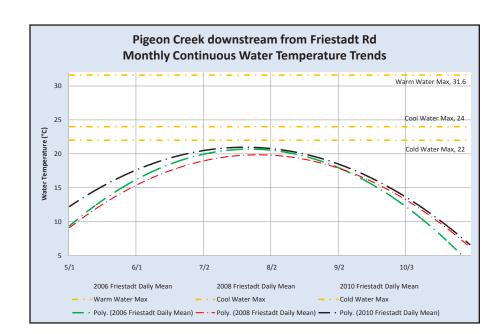


WDNR funded its removal and restoration of 350 feet of flowing stream in what had become a stagnant pond, at a cost of approximately \$38,000.

The dam was breached slowly in April 2007 to minimize erosion and migration of sediment, with the dam bulkhead removal and restoration activities continuing throughout the year. Besides the economic benefits, removal of the dam also helped to mitigate localized flooding and opened up more than 25 miles of stream and over 600 acres of wetlands to migrating steelhead, salmon, northern pike, sturgeon, and walleye. This represented an over sixtyfold increase in spawning habitat in the lower Milwaukee River system, which is highly developed and contains only about 10 acres of wetland from the Lake Michigan harbor entrance to the confluence of Pigeon Creek.

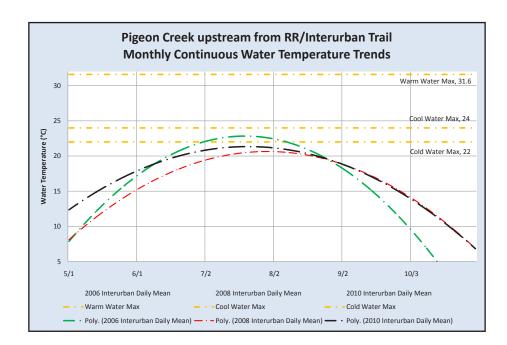
Pigeon Creek Downstream from Friestadt Rd. (Water Temp)

Pigeon Creek downstream of Freistadt Road is *upstream* of the former dam. In general, water temperatures at this site are below those considered by biologists to be the "maximum" temperatures that cool/cold water fisheries can handle (24 and 22 degrees Celsius respectively). Several days in summer see peak temperatures above those maximums for several hours, but the general trend lines show water temperatures far below standards for warm water fisheries (31.6 degrees Celsius).



Pigeon Creek Upstream of the Interurban Trail (Water Temp)

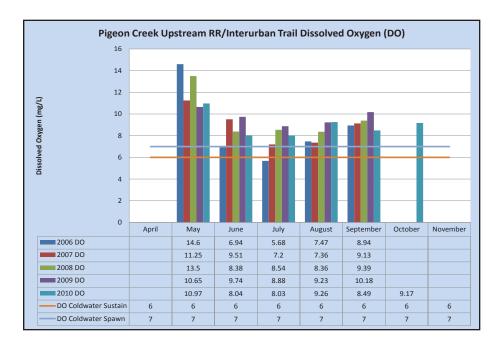
Pigeon Creek upstream from the Interurban Trail is *downstream* of the former dam. In 2006, prior to dam removal, water temperatures in the summer were regularly above the cold water maximum temperature at this site. Since 2006, general trendlines for hourly water temperatures are below the recommended cold water maximum of 22 degrees Celsius. The general trend lines show water temperatures far below standards for warm water fisheries (31.6 degrees Celsius).



Citizen Monitoring

Anticipating dam removal, Milwaukee Riverkeeper staff and volunteers began monitoring water quality on Pigeon Creek in 2006 both upstream and downstream of the Seminary Dam as well as the impoundment. Our intent was to conduct monitoring both before and after the dam removal in order to assess the effects on water quality and wildlife passage. We currently have 4 monitoring sites on Pigeon Creek (with one site at the former impoundment retired) where staff and volunteers collect monthly oxygen, temperature, pH, and turbidity data.

We also have thermistors or automated temperature devices installed in the stream that take continuous water temperature readings on an hourly basis at these monitoring sites. We are encouraged that our temperature and oxygen data, along with adequate physical habitat in the creek, suggest that Pigeon Creek might have cool water conditions sufficient for reproduction of trout and salmon (see figures). If these cool water temperatures hold up and additional wildlife surveys confirm fish reproduction, the stream could be formally re-classified as a cool or cold water trout stream (currently a designated warm water sport fishery). Re-classification would afford the stream more legal protection and make Pigeon Creek the southernmost "trout" stream in Wisconsin that is a tributary to Lake Michigan.



Pigeon Creek Upstream of the Interurban Trail (DO)

Pigeon Creek Upstream of the Interurban Trail is *downstream* of the former dam. Since the dam was removed in 2007, we have seen dissolved oxygen (DO) levels from 2008-2010 well above those suggested to sustain and accommodate spawning of cold water fisheries, especially in the hottest summer months of June through August.

Spotlight on Citizen Monitors

Milwaukee Riverkeeper is grateful to the more than 150 citizens who have actively participated in our volunteer stream monitoring programs since 2006. Several are spotlighted below.



Photo by David Zalewski.

John Schafer & Jessica Zalewski

John Schafer and Jessica Zalewski started volunteer stream monitoring together in 2010. Jessica, a marketing specialist at the Racine Art Museum, learned about Milwaukee Riverkeeper from her father, David Zalewski, also a Riverkeeper volunteer. Jessica views her participation in water quality monitoring not only as a way to help measure the health of our rivers, but also as a way to spend time with John, her husband, outdoors.

John is a project engineer at Lakeside Water Treatment. John became interested in Milwaukee Riverkeeper after reading about various projects on our website. He also attributes his decision to volunteer based on his outlook on natural resources. Says John, "I'm a firm believer in Aldo Leopold's land ethic and believe it is important for the people who benefit from the earth's resources to be the keepers and protectors for future generations."

In addition to their regular monitoring duties, John and Jessica participate in other Milwaukee Riverkeeper programs. Jessica has entered photographs in our Arts & Rivers Contest and was selected as a finalist in 2009 and 2011. John and Jessica also recently expanded their monitoring repertoire by participating in a 2011 pilot project studying the effects of road salt on local rivers and streams.

John and Jessica, we thank you for your enthusiasm, dedication and devotion to the water resources in our area!

Michelle Stanisch

Michelle Stanisch was in eighth grade when the first Earth Day was celebrated. She remembers environmentalism as being among the most important movements of that time, and remembers cleaning up a roadway with her class on Earth Day.

Michelle initially became involved in volunteer stream monitoring after attending a training class for rusty crayfish identification. The following year she received a letter asking if she'd like to participate in the introductory level water quality monitoring program. Michelle studied biology in college and works in a healthcare lab, so felt pretty comfortable with the "science part of monitoring" and thought that monitoring "might get me out of the house and into nature a little bit more." That was in 2006. Michelle has been diligently monitoring water quality ever since.

Michelle monitors three different locations along the Milwaukee River near Grafton below Lime Kiln Dam, below Bridge Street Dam, and above both dams. "I picked those locations because I know about the significance of a dam's effect on waterways. I thought these may be important locations to keep an eye on," says Michelle. One of these dams, the Lime Kiln Dam in Grafton, has since been removed in order to improve water quality and fish passage. This makes Michelle's 5 years of monitoring a great source of data for assessing the impact of the dam's removal on water quality.



Michelle is glad to be have been able to ramp up her participation in the environmental movement since that first Earth Day, from cleaning up a roadway to becoming a volunteer stream monitor. She says she likes contributing to "a project that has importance for the state of Wisconsin and the Great Lakes." Thanks Michelle!

To bring the Milwaukee River from its current **B**- grade to an **A**+ will take a community-wide effort. Below are some easy things you can do to help restore the health of the Milwaukee River Basin. Thank you in advance for your help and support!

What <u>YOU</u> Can Do



Reduce erosion and sediment entering the rivers

1) Adopt a River -- keep an eye on a section of river near you.

2) Educate and participate in land stewardship activities such as tree planting and invasive species removal.

3) Report potential sources of pollution from construction sites or stormwater outfalls, eroding areas, and other problems to Milwaukee Riverkeeper at <u>414-287-0207</u> or to the WDNR at <u>1-800-TIP-WDNR</u>.

Photo by Eddee Daniel.

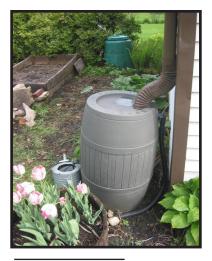


Photo by Milwaukee Riverkeeper Staff.

Reduce nutrients and polluted runoff

1) Prevent stormwater runoff by catching and encouraging slow infiltration of rain into soils with rain gardens, rain barrels (*like the one on the left*), cisterns, and planting of native vegetation.

2) Pick up after pets -- pet waste is a major source of bacteria to our rivers.

3) Use water wisely both inside and outside the home. Minimize use of water during heavy rain storms to minimize stress on local sewers and protect rivers from sewage overflows.

4) Eliminate or minimize use of fertilizers and pesticides on your property.

Stay engaged and help inform and educate others

1) Stay up-to-date on current issues affecting water quality and wildlife habitat.

2) Vote GREEN and advocate for fishable, swimmable, drinkable rivers and lakes. Contact elected officials and let them know that the health of the rivers and Lake Michigan is important to you.

3) Become involved in river cleanups, volunteer water quality monitoring, and other community events to protect our rivers and the land that drains to them.



Milwaukee River Report Card

— 2010 —



Our Mission

Milwaukee Riverkeeper's mission is to protect water quality and wildlife habitat in the river corridors and to advocate for sound land use in the Milwaukee, Menomonee, and Kinnickinnic River Watersheds.

Milwaukee Riverkeeper serves as an advocate and voice for the Milwaukee, Menomonee, and Kinnickinnic Rivers. Our core programming involves patrolling, monitoring, and advocating on behalf of the rivers. We also coordinate hands-on river restoration projects and organize thousands of volunteers each year in river cleanups.



Milwaukee Riverkeeper is a licensed member of

the Waterkeeper Alliance, an international coalition dedicated to clean water and healthy communities.

Our Vision

Milwaukee Riverkeeper envisions a future where all people within the Milwaukee River Basin can enjoy clean drinking water and fishable, swimmable rivers.

Funding for the 2010 Milwaukee River Report Card

Funding for the 2010 Milwaukee River Report Card provided by the Norcross Wildlife Foundation and the Schoenleber Foundation.

Contact Us!

For more information on the Milwaukee River Report Card and other programs of Milwaukee Riverkeeper:



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